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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/583,152

06/16/2006

Takeshi Minami

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7590

12/09/2008

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EXAMINER

LIAO, DIANA J

ART UNIT

PAPER NUMBER

1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,152	<b>Applicant(s)</b> MINAMI ET AL.	
	<b>Examiner</b> DIANA J. LIAO	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-16,18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) 16,18 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/3/2008, 8/15/2008</u> .                                     | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. This application contains claims 16, 18 and 19 drawn to a non-elected invention. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 7/3/2008 and 8/15/2008 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 3-9 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu, et al. (US 5,898,014) in view of Yagi, et al. (US 6,376,423).

Wu '014 teaches a catalyst composition comprising zirconium, cerium, neodymium and praseodymium components that are useful for the oxidation of hydrocarbons and carbon monoxide. (abstract) The catalytic composition comprises at least one precious metal, 40-80 wt.% zirconium component, 10-60 wt.% cerium component, and 2-15% wt.% of each neodymium and praseodymium components. (claim 6) This composition may further comprise at least one stabilizer. (claim 16) This stabilizer may be magnesium, barium, calcium or strontium (claim 17), which would be present from 0.05 to 30 wt.% based on the weight of the support material and stabilizer. (col 11, lines 13-15) A more quantitative composition is taught, reciting 0.01-2.5 g/in<sup>3</sup> of oxygen storage component, 0.025-0.5 g/in<sup>3</sup> additional zirconia, 0.025-0.5 g/in<sup>3</sup> additional rare earth metal and 0.025-0.5 g/in<sup>3</sup> of alkaline earth metal. (claim 25) The precious metals which are preferred include rhodium. (col 6, lines 63-67) Wu '014 also teaches this catalytic material to be present in the form of a layer on a honeycomb catalyst carrier, metal or ceramic (col 7, lines 38-44), which may be deposited by a washcoat. (col 14, lines 42-46) These carriers are disclosed to usually be of 200-400 cells per square inch. (col 14, lines 62-64)

Wu '014 does not teach zirconia to have a solid electrolytic property or that its composition to be a catalyst for producing synthesis gas. Wu '014 also does not explicitly teach a molar ratio of a second ingredient (Sc, Y or Lanthanoids) to a first ingredient (alkaline earth metal) to be 0.02 and 0.40 or a molar ratio of a third ingredient

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(zirconia) to the first ingredient to be 0.04 to 1.5. Wu '014 does not teach that the group VIII metal is carried at a rate of 100-50,000 weight ppm per unit weight of the carrier or at a rate of  $2 \times 10^{-7}$  to  $5 \times 10^{-3}$  mol/m<sup>2</sup> per unit surface area of the carrier.

Regarding properties of zirconia, since the composition appears to be substantially similar to that of the claimed composition, it is held that a solid electrolytic property is inherent in the zirconia.

The limitation that the claimed catalyst composition is used to produce synthesis gas is found to be an intended use and thus does not have patentable weight. Wu '014 teaches that its composition can be used for the oxidation of hydrocarbons. One of ordinary skill in the art would appreciate that a catalyst which can achieve oxidation can be used for a process of partial oxidation if the reactants are given in an amount which only allows for such, for example a less than stoichiometric amount of oxygen. Therefore, the prior art is still found to read upon the instant claims.

Although the ratios of ingredients are not explicitly taught, Wu '014 does appear to teach overlapping ranges of ratios. If the alkaline earth metal is taken to be magnesium, the conversion from weight ratios to molar ratios becomes overlapping with those of the claimed ranges. For calculations, the molar mass of the cerium oxide, praseodymium oxide, and neodymium oxide were taken to be approximated by the molar mass of CeO<sub>2</sub> because of the very close molar masses of Ce, Pr, and Nd, and the predominance of cerium oxide. The determination of the amounts of each component in the oxygen storage component were found based on the requirement that zirconia be

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present as 40-80% of the oxygen storage component. Calculations are summarized below:

	Oxygen storage component (g/in <sup>3</sup> )			Plus additional oxides (g/in <sup>3</sup> )			Molar amounts (div. by molar mass)		
	Total	ZrO <sub>2</sub>	CeO <sub>2</sub>	ZrO <sub>2</sub>	CeO <sub>2</sub>	MgO	ZrO <sub>2</sub>	CeO <sub>2</sub>	MgO
Min	0.01	0.004	0.002	0.029	0.027	0.025	0.000235	0.000157	0.000620
Max	2.5	2	1.5	2.5	2	0.5	0.0203	0.0116	0.0124
Values calculated from claims 6, 16, and 25									

Ratio of 2<sup>nd</sup> component (CeO<sub>2</sub>) to 1<sup>st</sup> component (MgO): 0.0126 - 18.73

Ratio of 3<sup>rd</sup> component (ZrO<sub>2</sub>) to 1<sup>st</sup> component (MgO): 0.0189 - 32.71

A *prima facie* case of obviousness exists when the claimed ranges overlap or lie inside ranges disclosed by the prior art. See *In re Woodruff* 16 USPQ2d 1934.

These calculations were made assuming that the alkaline earth metal/stabilizer chosen was magnesium oxide.

The choice of magnesium oxide, as well as the carrying rate per unit surface area, would have been obvious in view of Yagi '423. Yagi '423 teaches a catalyst for the preparation of synthesis gas. The catalyst contains at least one catalytic metal including rhodium (col 3, lines 9-12) and maybe supported on an oxide carrier of a single metal or mixed metal (col 3, lines 32-34) The metal oxides include those containing at least two metals such as Mg, Zr and La. (col 3, lines 63-65) Yagi '423 teaches magnesium oxide to be a preferred main oxide component by including it in all of its claimed catalyst compositions. (claim 1, note that claims are contained in a Certificate of Correction) Also taught in Yagi '423 is that the catalytic metal is supported in an amount of 0.001-0.08 mole% and the surface area of the catalyst being 5.8 m<sup>2</sup>/g or less. (claim 1) This results are in a rate of 1.724 x 10<sup>-4</sup> mol/m<sup>2</sup> or greater. Further calculating the mole percents of the rhodium or ruthenium metal on a carrier consisting

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essentially of magnesium oxide, using rhodium as the catalytic metal, the rate of 25.24-2020 ppm per unit weight of the carrier is found. These ranges of the prior art overlap the claimed ranges and therefore a *prima facie* case of obviousness is found. In addition, it would be obvious to one of ordinary skill in the art to support as much catalytic metal as is sufficient for intended use of the product.

One would be motivated to combine the teachings of Yagi '423 with Wu '014 because they are both drawn to the use of supported precious metals on mixed metal oxides for oxidation and Yagi '423 suggests that the use of magnesium oxide as a support is advantageous.

Therefore, due to overlapping ranges assuming the use of magnesium oxide as taught by Yagi '423, claims 1, 3-9, and 11-15 are not found patentable over the prior art.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu '014 and Yagi '423 as applied to claims 1, 8, and 9 above, and further in view of Allison, et al. (US 2002/0115730).

Wu '014 teaches a honeycomb carrier of 200-400 cells per square inch. Wu '014 and Yagi '423 do not teach the use of ceramic foams as a support for the catalyst, nor specifically one of 10-40 cells per inch.

Allison '730 teaches the use of a foam or a honeycomb as a support for impregnating or applying a washcoat of catalytically active material suitable for producing synthesis gas. The foam may be made out of a stabilized zirconia having 30-150 pores per inch. (paragraph 50). In addition, if the square root of the cells per square inch of the honeycomb taught in Wu '014 is taken, a value of approximately 14-

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20 cells per inch. These ranges overlap the claimed range of 10-40 cells per inch. One of ordinary skill in the art would be motivated to use such a foam because they are well known in the art as catalyst carriers, such as those used in Wu '014. Furthermore, Yagi '423 shows foam to be equivalent to or obvious variants of using a honeycomb structure and thus one would be motivated to use a foam with the catalytic composition of Wu '014.

Therefore, claim 10 is not found patentable over the prior art.

### ***Response to Arguments***

7. Applicant's arguments filed 8/15/2008 have been fully considered but they are not persuasive.

Applicant argues that the catalyst of the prior art cannot perform partial oxidation, which is possible of the claimed catalyst. However this is an intended use presented in the form of an argument and thus does not have patentable weight at this time. There is nothing of record which demonstrates that the catalyst of the prior art (Wu '014) cannot perform the intended function of the claimed catalyst. In addition, Wu '014 is modified with other references in order to achieve the claimed catalyst.

Applicant argues that even the limitation is considered "an intended use", the limitation can be distinguish from the prior art if the prior art is not capable of performing the intended use.

Granted that it is true, Applicant, however, does not provide sufficient evidence to show that the catalyst as disclosed in Wu is not capable of performing the intended use.



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It should be noted that in this case “capable of” means the catalyst would be able to promote the partial oxidation, but it does not have to perform as well as the claimed catalyst.

Applicant argues that Wu uses alumina as the support for the catalyst which causes an increase in carbon deposit if the catalyst was used for the catalytic partial oxidation process (CPOX).

Wu discloses that alumina is one of the suitable materials, thus, it would have been obvious to one skilled in the art to select other material as the support for the catalyst of Wu. Furthermore, Applicant’s claims do not include any limitation regarding the carbon amount.

Applicant further argues that the claimed catalyst shows unexpected results regarding the selectivity and use of the catalyst. However, these results are not commensurate with the scope of the claims, which do not specify any details about the improved function of the catalyst.

### ***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA J. LIAO whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 8:00am to 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Primary Examiner, Art Unit 1793

DJL